



Implementation of Weaving Training in Empowering Women in the Industrial Revolution 4.0 (Smart House *Sonaf Soet Hinef* Kota Kupang)

Margarita Adu¹, Sujarwo²

¹Department of Non-formal Education, Yogyakarta State University, Daerah Istimewa
Yogyakarta, Indonesia.

²Department of Non-formal Education, Yogyakarta State University, Daerah Istimewa
Yogyakarta, Indonesia

Email: margarithaadu.2017@student.uny.ac.id¹, sujarwo@uny.ac.id²

Abstract

This study aims to determine the process of women's empowerment in weaving during the industrial revolution 4.0, training in Vocational Village in *SSH* Smart House in *Kupang*, East Nusa Tenggara, along with supporting socio economic factors and barriers. The design of this study used a qualitative descriptive research method using a single case design. The research subjects in this study were the Head of Smart House Management under the auspices of the PPO Office, the craft center facilitator, and the weaving trainees. A researcher acts as a key instrument during data collection; cameras, recording devices, observation guidelines, interview guidelines and stationery. Data collection took place with observation, interviews and documentation; using data reduction, data presentation and verification. The findings show that the process of empowering women through weaving is not optimal, as seen from the indicators of the creativity of women who must be trained, the stages of the coloring process of weaving innovation, external and internal factors and development of empowerment. The results showed a change in: (1) Women's creativity in innovating weaving (2) weaving coloring training stages (3) external and internal factors in which there are supporting and inhibiting factors in the empowerment process, in the Vocational Village of *SSH* Smart House. From the results of this study, it was



concluded that all weaving trainees had the potential for the self-development. To be meaningful, the weaving experience must be developed.

Keywords: *Women, women's empowerment, weaving, innovation, adult education, Non-formal Education, Smart House.*

Introduction

The reality of the economic order of life is the presence of the fourth generation industrial revolution era (industry 4.0). This era is characterized by automation and a digital economy. The development of supercomputers, robots, artificial intelligence, and genetic modification resulted in a shift in the trend of labor that was no longer dependent on human power, but on machines. Competition in the era of industrial revolution 4.0 means mass production. This era requires creativity from the community to be ready to face competition. The current poverty reduction program lies in how people rely on their skills with the cultural potential inherited from their ancestors, even with a low level of education. Lisa (2012) provides the basis for discussion and research on heutagogy and the links between andragogy as a theory to guide the use of new technology in lifelong learning, self-determination and an emphasis placed on developing the abilities of learners, with the aim of producing students who are well prepared for today's complexity of the workplace.

Developed countries have developed lifelong learners in the context of non-formal education that can survive and develop a global knowledge economy. This is in stark contrast to Indonesia, especially East Nusa Tenggara, where, with a high percentage of literacy, the majority of women work as only family workers or unpaid workers (figure 1). Low levels of education and the lack of education efforts for East Nusa Tenggara women, including mothers, has a negative impact on individuals, their families and their surrounding environment. These problems also

occur in Papua New Guinea. The role of women in Papua New Guinea is limited to taking care of the household and caring for children. In Papua New Guinea, women are often excluded because of their low reading and education skills, so women are not involved in the training tradition (Barbara, Katja, 2017). Women's empowerment is a strategy to empower women to hone their skills with cultural heritage, that has been inherited by their ancestors; in this case weaving. "Weaving has an important role in social, economic and religious life in several ethnic groups in Indonesia, especially East Nusa Tenggara" (Chalid, 2000: p4).

In crafting custom woven fabrics, we find a number of creativity properties. At smart house *SSH*, women want to be able to weave (although simply) starting from knowing the stories of eastern weavers in their daily lives, only to deliver school children and cooking. Their financial conditions are still far from prosperity, so innovation from craft centers is driving to empower women through weaving . In the NTT Ternate Museum Woven book (*Museum Daerah NTT Tenunan Ternate Seri Terbitan Museum NTT*, 2014: p2), it is reveal that the "Traditions inherited from ancestors, limited natural potential, creativity, sensitivity to the environment, economic demands and industry market opportunities and giving birth to beautiful weaves". From the results of field observations, some of the women said that, for them, making woven fabrics was very philosophical and each motif had its own meaning. Even in ancient times, women were allowed to marry when they were able to weave. With the aim that they could provide clothes for their own families.

The "Ikat" weaving method for making decorated textiles is one of the most geographically widespread in Southeast Asia, used by Australian communities in Indonesia, Malaysia and the Philippines, and the Daic community in mainland Asia. (Buckley, 2012). Each region has distinctive features and patterns and has a distinctive identity as an enriching element of the Indonesian culture. This happens because each ethnic group inhabits an area that has

different sources and environments, so that the weaving produced is different (Suhardini, 2000: p7). Weaving is made based on what is in nature and what is in the culture of each tribe, so that the community expressed themselves in the form of motifs on woven materials . "The term tie was popularized by GP Rouffer in the European community, when he held an Indonesian traditional weaving exhibition in The Hague in 1901. The term weaving became a term used for this type of fabric by every traditional weaving expert.

Judging from its usefulness, woven products in East Nusa Tenggara consist of three types, namely: sarongs, blankets and scarves with woven base colors in general dark-based colors, such as black, brown, red heart and dark blue. This is due to the fact that the community / craftsmen used to use vegetable dyes such as tauk, mengkudu, turmeric, manga and other plants in the process of coloring threads. The colors of the dominant motifs were white, yellow and maroon red (Hartono, Sunarya, Sn, & Tradisi, n.d.). However, natural conditions make women innovate to develop colors and motifs while maintaining woven quality.

The *Sonaf Soet Hinef* Smart House in Kupang City has the role of serving the people who need non-formal education services. At the Smart House *Sonaf Soet Hinef*, there are 7 centers, ranging from book centers, science centers, food security centers, stage centers, play centers, audio centers, computer centers and craft centers. *Sentra Kriya* has the skills to weave, sew and recycle garbage.

Edwin B. Flippo, stated that "the purpose of training is to improve one's knowledge and skills". Training is also interpreted as a process of helping others in gaining skills and knowledge. then (Good, 1973) in (Kamil, 2010, p174). Expressing this, Ife & Tesoriero, explains that "empowerment aims to increase the empowerment of those who are disadvantaged (the disadvantaged)". (Ife & Tesoriero, 2008, 2016:p.590). Further, they explain that "training is the most specific educational role, because it involves teaching people to do something".



Weaving craftsmen in the *SSH* Smart House need to innovate. Like the weaving training of innovation carried out in Smart Houses in vocational village groups. Initially, the products produced were woven in the form of scarves, blankets, waste recycling, and other handicrafts. The presence of new craftsmen and technological advancements has made business competition increasingly globalized, making craftsmen weave to innovate. Termination can occur because someone becomes dissatisfied with an innovation, or because innovation is replaced with a better idea. It is also possible for someone to adopt innovation after the previous decision to reject it (Rogers, : 1962, 1971, 1983).

Research Methods

This study uses descriptive qualitative research methods. The research design is a case study, which is an intensive description and analysis in non-formal education programs in the context of empowering weaving women. The informants of this research are the Head of *SSH* Smart House Management under the auspices of the Youth and Sports Education Office, Craft Center Facilitators, and Training Participants.

Place and time of research

This research was carried out in the *Sonaf Soet Hinef* Smart House, *Sentra Kriya* in vocational villages (*Oepura area, Sikumana, and Belo*), with the time of the research carried out for 3 months in 2018.

Research subject

The research subject was all parties who could provide information on weaving, in the Smart House, in the vocational village group. The subjects of this study consisted of 24 people from

the Head of Smart Home Management under the auspices of the PPO Office, a craft center facilitator, and 20 training weaving participants and a smart home administration section.

Instrument

In this study, the instrument is the researchers themselves. The researcher acts as a key instrument during data and camera footage collection; recording devices, observation guidelines, interview guidelines and stationery.

Data source

The data sources obtained are primary data and secondary data.

Primary Data

Primary data is data obtained directly from the field or research site. The study obtained primary data based on observations, interviews and documentation that has been accredited by research examiners.

Secondary Data

The subjects in this study were the Head of Smart House Management, under the auspices of the PPO Office, craft center facilitators, and weaving trainees to find out the process of women's empowerment of weaving training during the industrial revolution 4.0, in Vocational Village in *SSH* Smart House in Kupang East Nusa Tenggara, along with socio-economic factors supporters and inhibitors.

Procedure for collecting data

In qualitative research, data collection is done in a natural setting. The primary data sources, and data collection techniques are observation, interviews and documentation (Sugiyono. 2009, 2011: p309).

Observation

In observation, the researchers observed the daily life of the weaving craftsmen. The observations starting from the initial stages to the final stages of tie weaving training. During the process of observation, researchers used observation guidelines and took notes.

Types of interviews

The types of interviews used were semi-structured interviews. In the implementation of the interview, to multiply the information, the data needed to be recorded to maintain the accuracy of information presented by the informant.

Documentation

Researchers using documentation is complementary to the use of observation methods in this study. Complementary documentation tools such as cameras, documents, or supporting reports were used to increase the accuracy of the data in the study.

Data analysis

The technique of analyzing data, in qualitative research, is the process of finding and compiling systematic data through interview transcripts, field notes and data summarized to

make reports. (Usman & Akbar, 2009 : 84). The three steps above were carried out and repeated each time to collect data until the research ends.

According to Miles and Huberman in (Usman & Akbar, 2009: 85-88) researchers conducted data analysis with the following steps:

Data collection

Data was collected from field research, using certain data collection techniques, with methods namely observation and documentation.

Data Reduction

Data reduction from the field is the process of selecting the main data points, to simplify abstracting and raw data, in order to sort important and needed data. The data will be drawing conclusions according to the research themes related to women's empowerment in weaving training at the SSH Smart House.

Display data

In qualitative research the presentation of this data can be done in the form of tables, graphs, phonecards, pictograms and alike so that it is easier to draw conclusions.

Verification

The initial conclusions put forward are still temporary, or not permanent, and will change if no strong evidence is found that supports the next stage of data collection. But if the conclusions put forward at the initial stage are supported by valid and consistent evidence, when

the researcher returns to the field collecting data, then the conclusions put forward are credible conclusions.

Data Validity Test

Qualitative research can be doubted because of a number of reasons, namely the subjectivity of researchers plays a dominant role in qualitative research. The tools that are relied on are interviews, observations and less reliable sources of qualitative data that will influence the results of the research accuracy. There are 4 criteria used that were developed by Sugiyono, (2008).

Test of credibility

This test is also called data credibility, which is a belief in the data from qualitative research to prove what has been observed; whether it is in accordance with the results of the findings, with evidence from the researcher. (a) extend observation, (b) increase perseverance, (c) triangulate, (d) discussion with colleagues, (e) member check. Implemented in this research is the following:

1. Field observation. This research was carried out outside of the province of Java, namely in the Province of East Nusa Tenggara, where that the initial observations for one month were extended with data collection for three months, so that the researchers conducted in-depth observations.
2. Test Triangulation, data obtained from the results of data collection, interviews, observation and documentation to find out the truth.
3. Peer discussions, involving several colleagues who are experts in the field studied by the researcher.

4. Member check. This is done by checking the data that has been summarized by the researcher. The goal is for informants to assess the data collected in accordance with what happened in the field.

Transferability testing

The researcher must be able to explain the results in a detailed, systematic and accountable manner.

Dependability testing

Conducted with an audit of the entire research process, which requires researchers to collect and describe data to be able to interpret and draw conclusions.

Confirmability

The result that can be verified by matching the results of the study in accordance with the data obtained from the field. Confirmability is proven where the data is obtained and processed to attain the truth.

Research Result And Discussion

Tie Weaving Training

East Nusa Tenggara (NTT) is an Indonesian province located in the southeast of Indonesia. The province consists of several islands, including *Flores, Sumba, Sabu, Rote, Timor, Alor, Lembata, Adonara, Solor, and Komodo*. The capital is located in Kupang. This province consists of approximately 550 islands; the three main islands in NTT are *Flores, Sumba* and *Kupang*. Smart House, which is located on the outskirts of the city. The Naioni Region is still a rural area, which means that the economic level in the area is still in the middle to lower position.



Smart House is the name of a building that contains educational programs, for mothers and children, offered through various learning resources. In Smart House, there is a craft center which is a mainstay of the centers to empower the community. This center aims to increase the income of the local population. Sentra Kriya is designed to provide life or vocational skills (Suryono Yoyon (2012: p11). In the NTT Museum Issue series (2014: p16)(*Museum Daerah NTT Tenunan Ternate Seri Terbitan Museum NTT*, 2014), it states that "humans depend on nature, humans also need to work by working for their lives". It is also emphasized in the article that poverty is caused by limited skills and a lack of employment opportunities, in the province. Non-formal center for education and training (Government NFET) and those run by non-profit organizations (NPO) provide technical and entrepreneurship skills training for rural and urban adults (Celestin, 2017).

The purpose of empowerment through training was held based on the needs of women to fulfill their family's needs; it was not enough to expect income from the male head of the household. Economic opportunity allows women to have a level of mobility and a portable livelihood in new places, and its symbolic value enriches the bond of female character with women between generations. (Mary, 2018) . At first, articles in the craft center are woven in the form of a sarong, then a scarf and shawl. The craftsmen received special attention from the Smart House management under the auspices of the Department of Youth and Sports, providing assistance in the form of traditional looms, natural coloring materials and chemical dyes, for women who had the spirit of weaving, which was divided into 20 Vocational Village groups. The resulting products also vary, namely woven bags, curtains, wallets, women's accessories, footwear, table cloth, etc. These article were produced after guidance through training with facilitators who are experts in weaving. The need for Natural fibers, as raw material, is increasing because demand

from consumers has increased . This is partly because, in East Nusa Tenggara, Thursday has become a traditional dress day.

Empowerment Activities

According to Suryono (2012: p5) "Smart House is one of the solutions to the problem of underdevelopment and underdevelopment of society in the field of education to develop the quality of people and the people of Indonesia". This is in line with Siswoyo Dwi, et al (2011: p24) "Education to prepare humans as humans", or more clearly in the opinion of Driyarkara (1980: p78) that "education is an effort to humanize humans.

Regarding the opinions of the experts, the author expressed his thoughts by combining the views of Baiyin Yang and Paulo Freire (2013: pvi)(Yuan, Mei, Hu, Wang, & Yang, 2013). From the above, thoughts tend to be related to adults (women). Adults are not an empty vessel filled by facilitators according to their wishes. However, citizens are vessels that have different capacities, different volumes and contents.

This was demonstrated by the community empowerment activities in Naioni SSH Smart House. Since 2005, its development has shown progress in the training process, according to the capabilities and potential of the community. The existence of the *SSH* Smart House became even more prominent when the Republic of Indonesia Minister of Education and Culture Regulation *No. 81 of 2013*, concerning the establishment of a Non Formal Education Unit (PNF), was developed to accommodate community learning needs that cannot be fulfilled through other educational units.

Women's empowerment activities aim to develop weaving crafts and other demanding factors. The role of the government in community empowerment activities is to provide facilities and infrastructure in the form of looms and raw materials used in the weaving process.

Community empowerment starts from recruiting citizens, especially women, according to their needs and potential.

Weaving Craft Innovation

Innovation Stage

"Through the process of learning and sharing knowledge, interaction, reflection and negotiation can influence the attribution of meaning, formation and change in norms of behavior, and also modify and change the initial idea of change" (Krista, 2012) (Sudjana, 2000). Innovative planning is a process of drafting a plan that focuses on changing functions and institutional insights to solve the problems of people's lives, which is the function of various institutions.

- a) A vision of Helping Women in ikat weaving crafts to fulfill the economy of ikat weaving training.
- b) Mission: (a) Instill the value of entrepreneurship with the talent (weaving) that is owned. (b) Transforming the lives of women so that they are able to meet their own needs. (c) Provide training in terms of design and marketing to be able to innovate with the creativity they have. (d) Building cooperation with city governments and villages so that they do not continue to be in poverty or left behind.

Strategy is planning and implementing a series of action plans to achieve competitive and comparative advantage. Weaving is a fabric-making technique with a simple principle, combining threads extensively and transversely. The word "Ikat" is the Malay word for binding. The procession involves dying threads of various colors according to the pattern that must be

realized. But first, some portions are tied to protect from dyeing. (Resist Dye on the Silk Road, 2014).

The stages of the process of making tie weaving.

Steps for implementing tie weaving

- a. Yarn Rolls : The process of rolling the yarn is carried out by means of the thread being opened and then installed on a yarn roller called a "WOE" (In Ende Language) made of wood.
- b. Stretching Yarn : The rolled yarn is stretched back to the assembly called "IGO" (In Ende Language) measuring 175cm. After that, the Wool yarn is used to make the boundary of the silk thread that you want to tie.
- c. Binding Motives : Yarn that has been stretched forms a motif that can follow existing motives or be developed from individual creativity.
- d. Dyeing or coloring of threads : The dyeing process is carried out by wetting the thread that has been tied according to the desired pattern / motif and inserted into the first staining container and left to stand for 10 minutes. After being transferred to the second staining container and left for 10 minutes, the thread is removed and washed with clean water.
- e. Wetting the thread with starch : After the yarn has been dyed the yarn will be dipped in starch so that the color of the yarn lasts longer and stiffens.
- f. The drying process : Yarn motif, that has been moistened with starch, dried in the sun to dry quickly.
- g. Open the rope ties on the thread : The dried yarn has all the rope ties opened one by one using a cutter or scissors.

- h. Separating Motif Yarn : Reinsert the thread, that has been opened by the string, into the field to arrange the motif.
- i. Arrange thread motifs : Tidy up the Motif by arranging the legs to form a motif.
- j. Stretching Plain Threads: Stretching plain threads or colorful threads as decorative boundaries between motifs and motif.
- k. Pinning the thread using a stick with a raffia strap : In this process, insert a stick on the thread and tie it with a rope so that the motif is not damaged.
- l. Insert nylon thread as a thread limiter over the lower thread : At this stage the nylon thread is inserted into the motif thread, as the upper thread divider, and is ready to be used for inserting the inner thread.
- m. Weave : After all the processes are done, the motif thread is ready to be woven into a motif.
- n. Results of Tie Weaving Motifs: Fabric Motif that has been produced is ready to be used or marketed.

Weaving Technology Training Activities

The purpose of the meeting is to make woven to produce fabrics with certain specifications, motives and the best quality, as little waste as possible and with optimum productivity of workers and equipment. Productivity and quality in the woven fabric process are first determined by the quality of the yarn and the dyes used, in addition to the perfection of the equipment used and the skill of the weaver himself. The motifs of the ikat cloth are obtained by binding to a specific place in the yarn group used for warp yarns.

A. Stages of Making IKAT Weaving

- a. Planning for construction includes the following provisions:
 - a) The length and width of the fabric
 - b) Number and type of material

b. Prepare warp and weft yarns

a) Remove dirt or starch that is still attached to the thread by cooking with soap and soda water, left standing overnight then washed and dried in the sun to dry.

b) Greasing the thread

- The thread is rolled on a small rock into a round roll
- The thread is rolled on a spool using the yarn reel tool

c) Serve warp

- Curl the yarn on two pieces of wood stretched parallel (implemented by 2 people)
- Curl the yarn on a Scaffolding with every 1-2 round of tie

d) Motive

- Image and size
- The number of threads passed by each motif
- Number of motifs tied
- The number of groups rolled and treated

c. Design and tie

Designing are certain parts of warp yarn or weft in accordance with the desired motif. There are several forms or types of designs:

- Designers who tie designs directly to the thread without reading the pictures.
- If the desired color is more than 2 colors, then each symbol is given certain symbols for the difference in color.

d. After the warp is tied the yarn is released from the scaffold then dyed. There are some fastness dyes that can be used, including:

a) Natural dyes

- Indigo / kanobo for blue
- *Mengkudu* (*morinda citrifolia*) / red combi
- Turmeric (*curcuma longa*) for yellow

b) Chemical dyes

- Sulfur dyes
- Naptol dyes
- Procion dyes

e. Unfold warp

After dyeing and the yarn is dry, then proceed with unwinding the warp design bond.

f. Move the yarn to the loom

Warp is stretched to the loom on the yarn bomb device followed by the work setting the design.

g. Installation of cross straps (Gun)

Installation of cross straps can be carried out when decomposed and can also be done when the yarn is fixed on the loom. This depends on the person doing it. The cross rope or gun serves to regulate woven yarn.

h. Weaving equipment

a) Traditional Gedongan weaving equipment

b) Semi-traditional weaving equipment (modification)

c) Non-machine loom (ATBM)

d) Weaving machine (ATM)

i. Greasing equipment

a) Traditional

- Kinjoro
- Round Stone

b) Semi-traditional

- Kinjoro
- Klos
- Mountain tool

j. Hani equipment

a) Traditional

Dua buah kayu bulau dibentangkan sejajar kemudian dikerjakan oleh dua orang

Two pieces of lime wood were stretched parallel and then worked by two people

b) Semi Traditional

Menghani uses a screening tool and yarn directly from the Kinjoro tool or directly from the toilet, which is yarn that has been rolled with a roll.

Although located in the suburbs, women do not grow their own cotton, natural dyes needed for weaving. From the data obtained from the Smart House the results of interviews with the Smart Home Manager (SHM), Aram Kolifai (AK).

"All registered participants are collected 5 people / groups each and are trained by instructors from Rumah Pintar for 2-3 months. The material is given in classical and practical forms. The length of training every day is between 5-6 hours. Tools and materials as well as facilities and infrastructure are all assisted by the City Government of Kupang. (AK/SHM/2019)"

From the results of the interview, the management showed the high desire of the government to develop the economy of women and the people in Naioni. But the obstacle is women. The following are interview data from 20 trainees, but researchers describe one of the overall results. Training Participant (TP), Agustina Regi (AR) as group leader of four groups.

"I express my gratitude to the government, and Non-Formal Education institutions, through Rumah Pintar *Sonaf Soet Hinef*, for helping our family's economy, through training in weaving because I learned to weave when I was 7 years old and now I am 48 years old. I come from a different tribe, and because of the training in ikat weaving can allow me to weave from other tribes. Besides being happy to be able to help my husband make a living for food and children's school fees, I can continue to preserve ancestral culture. But I still have problems when, there are consumers who order ikat, then pay first, and then we do the weaving. So the money given was used up before I finished weaving the weaving. That makes me lazy (AR/TP/2019)".

From the interview results, the learning community showed positive results from the presence of Non-formal Education through the Rumah Pintar institution in the craft center, namely weaving, to help improve the community's economy and empower women, but the problem was with

these women. Of course, weaving training needs to be inputted on how women eliminate their weaknesses and increase their enthusiasm and potential in entrepreneurship weaving.

(Vincent, 2012). With a vigorous effort to minimize or eliminate our weaknesses, while at the same time helping us reduce or avoid potential threats, cooperation between groups and institutions is needed to improve the competence of their human resources.

Conclusions and Suggestions

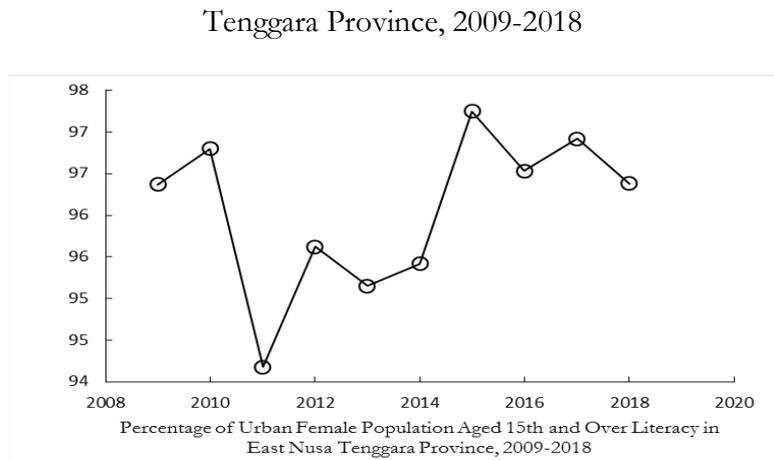
Conclusion

Empowerment gives meaning to the training process which is encouraging women to get up and have a career. If the facilitator has provided the learning community then the learning community can run the learning process independently because each woman in the group has been assisted by government facilities and infrastructure. Women who are members of vocational village groups will grow up as human learners, according to the concept of andragogic learning. Women will continue to be accompanied so that, after their training, continue to move towards cultivating their ancestral heritage.

Suggestions

Craft sentra is a forum for women to preserve their ancestral culture. But, in the industrial era 4.0, there is intense competition. The presence of pirated weavings is a threat to weavers who must be able to maintain the cultural values in a weaving. The government needs to focus on paying attention to the well-being of women not only in facilities and infrastructures but also through guidance, to create marriages after training so that they can create jobs for themselves and fulfill family needs.

Figure 1. The percentage of urban female population aged 15th and over literacy in East Nusa



Source: BPS RI - Susenas, 2009-2018(Statistik, 2017)

Figure 2. Data analysis technique

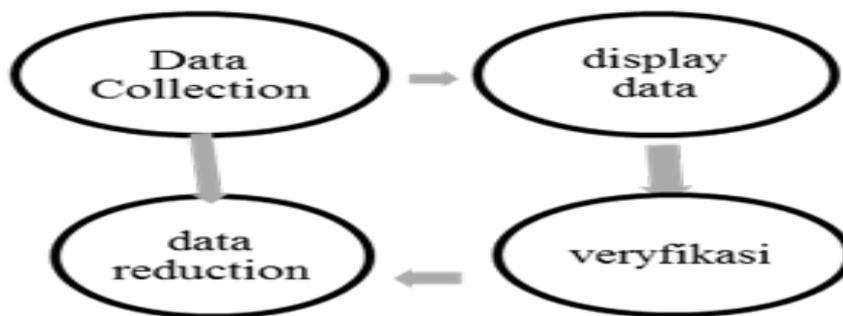


Figure 3. Dyeing various textile fibers with several types of dyestuffs accordingly.

No	Type of fiber/ Pigment	Cellulose	protein	polyamide	polyacrylate	polyester
1	Acid	-	+	+	(+)	-
2	Basa	(+)	+	-	+	-
3	Direl	+	(+)	(+)	-	-
4	Mordant	-	+	-	-	-
5	Metal complex	-	+	+	(+)	-
6	Naphtol	+	-	-	-	(+)
7	reactive	+	+	+	-	-
8	Sulfur	+	(+)	-	-	-
9	Vessel (Vat)	+	(+)	-	-	(+)
10	The vessel dissolves	+	+	-	-	-
11	oxidation	+	-	-	-	-
12	dispersion	-	-	+	+	+
13	pigment	+	+	+	+	+

note : + = commonly dyed (+) = can be dyed - = cannot be dyed

Figure 4. Trainees



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